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JAPAN · ECONOMIC · INSTITUTE

JEI

REPORT

NO. 26A July 18, 1986

STEEL: AN EXAMPLE OF SHIFTING INTERNATIONAL COMPARATIVE ADVANTAGE

Summary

While world steel output increased six-fold in the postwar era, U.S. production actually fell. The decline of the domestic industry reflects structural changes in the U.S. economy and the substitution of lightweight materials for steel. In addition, the rapid rise of imports, which captured 25.2 percent of the market in 1985, indicates a loss of U.S. competitiveness. Protected by a series of import restrictions since 1968, the U.S. industry allowed spiraling labor costs and low rates of investment to raise its costs above those of foreign producers. But while problems plague large integrated steel producers, the outlook for mini mills appears bright.

Japan is now the largest producer of steel in the free world. Steel remains an important component of its economy, accounting for about 7 percent of output and exports. Its steel industry appears threatened, however, by increasing output in developing countries, led by Korea, Brazil, Taiwan, Argentina, Mexico and Venezuela. Although it remains the world's largest steel exporter, Japan's shipments have declined since 1976, a harbinger of the future as steel production in the developing countries expands.

Overview of Trends in Major Steel-Producing Countries

United States - At the end of World War II the United States was the world's dominant steel producer, accounting for over half of global output.

Note: All quantity figures used in this report are stated in terms of net tons.

From 88.6 million tons in 1948, raw steel production climbed to 112.7 million tons in 1957 and peaked at 150.8 million tons in 1973, although the U.S. share of world production fell as other advanced countries recovered from the war (see Table 1).

Table 1: Steel Output in the United States, Japan and Korea

(in millions of net tons of raw steel)

	United States		Japan		Korea	
Year	Output	Percent of Free World Total	Output	Percent of Free World Total	Output	Percent of Free World Total
1957	112.7	46.6%	13.8	5.7%	0.0	0.0%
1958	85.3	40.6	13.3	6.3	0.0	0.0
1959	93.4	39.8	18.3	7.8	0.0	0.0
1960	99.3	39.5	24.4	9.2	0.0	0.0
1961	98.0	35.9	31.2	11.4	0.1	0.0
1962	98.3	35.9	30.4	11.1	0.1	0.0
1963	109.3	36.9	34.7	11.7	0.2	0.1
1964	127.1	37.0	43.9	12.8	0.1	0.0
1965	131.5	36.8	45.4	12.7	0.2	0.1
1966	134.1	36.7	52.7	14.4	0.2	0.1
1967	127.2	33.3	68.5	17.9	0.4	0.1
1968	131.5	32.1	73.7	18.0	0.4	0.1
1969	141.3	31.4	90.5	20.1	0.5	0.1
1970	131.5	28.5	102.9	22.3	0.5	0.1
1971	120.4	27.7	97.6	22.4	0.5	0.1
1972	133.2	27.8	106.8	22.3	0.6	0.1
1973	150.8	27.9	131.5	24.3	1.3	0.2
1974	145.7	26.7	129.1	23.7	2.1	0.4
1975	116.6	25.0	112.8	24.1	2.2	0.5
1976	128.0	25.6	118.4	23.7	3.9	0.8
1977	125.3	25.7	112.9	23.2	4.7	1.0
1978	137.0	26.5	112.6	21.8	5.5	1.1
1979	136.3	24.8	123.2	22.4	8.4	1.5
1980	111.8	22.0	122.8	24.2	9.4	1.9
1981	120.8	24.1	112.1	22.3	11.9	2.4
1982	74.6	17.2	109.7	25.3	13.0	3.0
1983	84.6	19.1	107.1	24.1	13.1	3.0
1984	92.5	19.0	116.4	23.9	14.4	3.0

Source: American Iron and Steel Institute, Annual Statistical Report, selected issues.

Since 1970, however, the industry, particularly large integrated producers, has been in a state of quasi-permanent recession. Construction of the

The JEI REPORT (ISSN 0744-6489) is published weekly for $40 per year by the Japan Economic Institute of America, 1000 Connecticut Avenue, N.W., Washington, D.C. 20036. Second class postage paid at Washington, D.C. POSTMASTERS: Send address changes to JEI, 1000 Connecticut Avenue, N.W., Washington, D.C. 20036.

last new major steel works began in 1962. Since 1977, roughly 200 production facilities have been closed, reducing U.S. steelmaking capacity from 160 million tons to 133.6 million tons in 1985.

The problems of U.S. industry have been exacerbated by several sharp economic recessions. For example, average annual steel production from 1980 to 1984 was 9 percent below 1960-64's level and represented 20.3 percent of free world production compared with 37 percent in the earlier period. Employment in the steel industry has plunged sharply during the past two decades, with the number of hourly employees falling from a peak of 458,539 in 1965 to 291,483 in 1980 and to 170,694 in 1984. U.S. producers reported losing a total of $7.4 billion on steel operations in the 1982-85 period.

The United States became a net importer of steel mill products for the first time in 1959 when a 119-day labor strike forced domestic steel users to turn to foreign sources. From 1958 to 1980, 85 percent of the increase in imports came in the final year of labor contracts, as the threat of possible strikes prompted American industries to build up their inventories with foreign steel. Imports, attracted by U.S. prices approximately 20 percent higher than world levels, totaled 24.3 million tons in 1985 and accounted for 25.2 percent of apparent U.S. steel supply (see Table 2).

Table 2: U.S. Imports of Steel Mill Products

(in millions of net tons)

Year	Total Imports	Imports as Share of Apparent Supply	Imports from Japan	Imports from Korea
1974	16.0	13.4%	6.2	0.9
1975	12.0	13.5	5.8	0.4
1976	14.3	14.1	8.0	0.8
1977	19.3	17.8	7.8	0.8
1978	21.1	18.1	6.5	1.1
1979	17.5	15.2	6.3	1.0
1980	15.5	16.3	6.0	1.0
1981	19.9	18.9	6.2	1.2
1982	16.7	21.8	5.2	1.1
1983	17.1	20.5	4.2	1.7
1984	26.2	26.4	6.6	2.2
1985	24.3	25.2	6.0	1.9

Source: American Iron and Steel Institute, Annual Statistical Report, selected issues.

Japan is this country's largest supplier. From a 1958 level of 250,000 tons of steel, U.S. purchases of Japanese-made steel mill products expanded to 7.3 million tons in 1968. Since then, a variety of import-restrictive devices have helped limit shipments to between 4 and 8 million tons annually. Last year imports from Japan totaled 6 million tons, accounting for one-fourth of

total imports and 6.2 percent of apparent U.S. supply. While imports from Japan fluctuated sharply from year to year in the first half of the 1980s, purchases from Korea increased strongly, more than doubling between 1980 and 1984 before declining last year to 8.1 percent of total imports.

U.S. steel firms have pursued a variety of strategies to improve their position, including diversification, mergers and joint ventures with foreign producers. Steel accounts for only 31 percent of the revenues of the largest producer, United States Steel Corp., which has expanded into oil, chemicals and real estate. In a move symbolic of steel's decline, it changed its name last week to USX Corp., a step many observers believe to be a prelude to selling its steel operations. LTV Corp. went the merger route, combining its Jones & Laughlin Steel Corp. with Republic Steel Corp. to form LTV Steel Co. Examples of joint ventures include the December 1985 agreement between the top U.S. producer and Korea's Pohang Iron & Steel Co. on a $300 million modernization plan for U.S. Steel's California plant and the 1984 sale of a half interest of National Steel Corp., the number-six domestic maker, to Nippon Kokan K.K.

Japan - The growth of the Japanese industry in the postwar period is unparalleled in the history of steel production. Output increased from only 1.9 million tons of raw steel in 1948 to a peak of 131.5 million tons in 1973; it surpassed the United States in 1980 and is now second only to the Soviet Union. Most of the increase occurred during the period of rapid economic growth in the 1960s.

Large steelmaking plants with huge blast furnaces employing the most efficient steel-production methods are characteristic of Japan's industry. All major plants are located on the coast with deep water ports to facilitate imports of materials used to manufacture steel and exports of the finished product. The expanding Japanese steel industry adopted the then-new "basic oxygen" process of steelmaking. Unfortunately, the U.S. steel industry was already mature before the oxygen process had fully proven its superiority. As a result, 91 percent of U.S. steel output in 1958 used the open hearth method, a technology that dated from the turn of the century, while 70 percent of the steel produced in Japan was already the product of the basic oxygen method. Moreover, Japanese firms were quick to adopt continuous casting, in which hot steel directly from the furnace is transformed into finished products, resulting in reductions of 40 to 50 percent in energy requirements, 15 to 20 percent in raw steel and 10 to 15 percent in labor requirements. Nearly 90 percent of Japanese steel in 1984 was produced using continuous casting, compared to only 40 percent in the United States.

The Japanese steel industry expanded to supply both the rapidly growing domestic economy and the expanding world market. From 1959 to 1969, the industry's period of fastest growth, world steel exports increased at an average annual rate of 9.5 percent. Japan's exports increased from only 2.5 million tons in 1960 to 17.1 million tons in 1969 (see Table 3). Although overseas shipments have declined from the 1976 peak of 39.7 million tons, they continue to account for about one-third of domestic production. In addition, other major exporting industries, such as shipbuilders and automotive makers, use large amounts of steel. It is estimated that about 60 percent of Japan's steel output is destined for export either as steel products or in the form of products containing steel.

Table 3: Exports of Steel Mill Products from the United States, Japan and Korea

(in millions of net tons)

	United States		Japan		Korea	
Year	Exports	Percent of World Total	Exports	Percent of World Total	Exports	Percent of World Total
1960	3.0	6.7%	2.5	5.6%	0.0	0.0%
1961	2.0	4.5	2.5	5.7	0.0	0.0
1962	2.0	4.2	4.3	9.0	0.0	0.0
1963	2.2	4.4	5.9	11.6	0.0	0.0
1964	3.4	5.9	7.2	12.3	0.0	0.0
1965	2.5	3.8	10.7	16.2	0.0	0.0
1966	1.7	2.6	10.5	15.8	0.0	0.0
1967	1.7	2.3	9.7	13.3	0.0	0.0
1968	2.2	2.6	14.1	16.8	0.0	0.0
1969	5.2	5.7	17.1	18.5	0.0	0.0
1970	7.1	7.1	19.4	19.5	0.1	0.1
1971	2.8	2.7	25.5	24.1	0.1	0.1
1972	2.9	2.5	23.0	20.4	0.5	0.4
1973	4.1	3.3	27.3	22.0	0.9	0.7
1974	5.8	4.0	35.5	24.6	1.3	0.9
1975	3.0	2.3	31.9	25.3	1.0	0.8
1976	2.7	1.9	39.7	28.5	1.5	1.1
1977	2.0	1.4	36.8	26.4	1.5	1.0
1978	2.4	1.6	34.0	22.3	1.8	1.2
1979	2.8	1.8	33.8	21.7	3.5	2.2
1980	4.1	2.7	32.7	21.4	5.0	3.3
1981	2.9	1.9	31.3	20.3	5.2	3.4
1982	1.8	1.3	31.6	21.6	6.1	4.2
1983	1.2	0.8	34.0	21.7	6.3	4.0

Source: International Iron and Steel Institute, Steel Statistical Yearbook, 1984.

In the 1950s steel exports were viewed as necessary to pay for the raw materials used in production. The industry continues to rely heavily on imported inputs. To produce 116 million tons of raw steel in 1985, Japan imported 137.2 million tons of iron ore (100 percent of requirements) and 69.5 million tons of coking coal (95 percent of requirements).

During the 1973-74 steel boom, Japanese companies inaugurated an expansion plan that had increased productive capacity to between 155 and 160 million tons by 1980. With slowing demand for steel at home and abroad creating excess capacity, though, producers have concentrated in recent years on installing new technology to improve efficiency, reduce costs and conserve energy. From 1973 to 1982, energy consumption per unit of raw steel declined 16 percent and the share of oil in total energy used fell from 20 percent to 7 percent.

Despite its success, the Japanese steel industry faces a period of uncertainty both in the short run and over the long term. Japan's share of world steel exports fell from 28.5 percent in 1976 to 21.7 percent in 1983 and is thought to have slipped again in 1984 and 1985, in part because of constraints on shipments to China and the United States, which have accounted for nearly half of exports in recent years. Neither country is likely to provide an expanding market in the near future; shipments to China are limited by its lack of foreign exchange, and exports to the United States are capped under a voluntary restraint arrangement that runs through 1989. Moreover, the appreciation of the yen will worsen Japan's competitive position relative to developing-country producers, which account for an increasing share of world steel trade. With profits of the six major Japanese steelmakers already down between 12 percent and 25.3 percent in FY 1985 and expected to fall more in the current fiscal year, capital expenditures are projected to decline in FY 1986 for the third consecutive year.

In addition to cost-cutting measures, Japanese steel companies are attempting to stay profitable through diversification and overseas investment. At Kawasaki Steel Corp., the number-three producer, steel accounted for 85 percent of the firm's net sales in the April 1985-March 1986 period, while 4 percent came from chemicals and 11 percent from engineering services and other activities. By the year 2000 Kawasaki expects steel to account for only 60 percent of net sales, with other products and services, such as carbon fibers, ceramics and data communications, accounting for the remainder. In addition, Kawasaki has invested in overseas facilities, including a steel slab plant in Brazil and a rolling mill in Fontana, California.

Korea - While output and capacity have been shrinking throughout the industrialized world, developing countries have expanded their steelmaking capacity significantly. Korea, whose steel output increased from less than a million tons in 1972 to 14.4 million tons in 1984, is an important new producer. Its exports have also increased rapidly, reaching 6.3 million tons in 1983. Unlike producers in developed countries, Korean firms have ambitious plans to increase their steelmaking operations.

Korea's Pohang facility is generally acknowledged as the world's most efficient steel plant. Built with Japanese technology, it has a capacity of 9 million tons. The industry benefits from low labor costs of about $3 an hour, compared to $20 in the United States. But like Japan, Korean firms rely on imports for nearly all of the iron ore and coking coal used in steel production.

What Caused the Decline in the U.S. Industry?

The deline of this country's steel industry has been blamed on a variety of factors, including low rates of investment, high labor costs, import protection and structural changes in the economy. Each of these factors will be explored in the following sections.

Low Rates of Investment - Expenditures on plant and equipment in the 1970s were no higher than in the 1950s and substantially less than in the 1960s. As a result, the real net productive capital stock in 1980 was about 14 percent below 1974's. Investment was discouraged by a decline in the rate of return on capital, which averaged less than half the rate in all manufacturing

from 1958 to 1983. This reduced the amount of investment money that could be generated internally, forcing a growing reliance on external financing and increasing the proportion of funds devoted to repayment of long-term debt.

The low rate of investment combined with an emphasis on pollution control led to an increase in the age of steel's capital stock, indicating technological backwardness. During the 1970s, the vintage of the plant stock aged 4.5 years and reached nearly 19 years in 1980, compared to a manufacturing average of about 15 years. In addition, the average age of the steel industry's productive equipment rose over one year to 8.7 years, compared to about 7 years for the manufacturing sector.

A related factor has been the industry's slow adoption of technological innovations, such as basic oxygen furnaces and continuous casting. As mentioned above, these technologies enabled makers abroad to lower the costs of inputs, including energy, despite major price increases in the 1970s. The financial difficulty of many U.S. producers made it difficult for them to invest in new production methods. And firms with capital to invest were often attracted to the higher returns available in other areas, such as oil.

Spiraling Labor Costs - An 11 percent average annual increase in compensation in the face of declining labor productivity doubled unit labor costs in the United States between 1974 and 1980. Steel workers' wage gains exceeded the 9.2 percent annual growth in other industries, hitting $17.01 per hour compared to $9.28 for all manufacturing. The 80 percent wage premium paid to steelworkers in 1980 was all the more surprising in view of the fact that steel workers have a lower-than-average level of technical expertise.

Steel industry wages began rising rapidly in 1971, following the dollar devaluation and the implementation of voluntary steel export restraint agreements. Management's desire to end the threat of strikes, which encouraged large jumps in imports every three years, led to the Experimental Negotiating Agreement in 1973. This arrangement allowed large wage increases by guaranteeing production workers 3 percent annual wage increases, cost of living adjustments and productivity bonuses in exchange for a no-strike pledge. Although union concessions have lowered hourly compensation from its 1982 peak of $23.78, U.S. labor costs remain far higher than those of other countries. In 1983, American labor costs per ton of steel were $154 compared to $104 in Japan and $22 in Korea.

Import Protection - Washington set out to protect the domestic steel industry in 1968 when imports reached 17 percent of domestic consumption. Japan and the European Community agreed to three-year VRAs that limited their U.S.-bound exports of steel mill products to 4.75 million tons each. A second, more comprehensive set of restraint arrangements was then negotiated covering the period through 1974. Following the 1975 recession, imports rose to 18 percent of the U.S. market in 1977. As an alternative to the numerous dumping cases filed by the industry, President Carter established the trigger price mechanism, which was designed to prevent foreign firms from selling steel below a price based on Japanese production costs. This was replaced in 1982 by a three-year agreement between the United States and the EC limiting European exports to this country.

In the summer of 1984 the International Trade Commission ruled that imports of semi-finished products, plates, sheets and strip, wire and wire products and structural shapes had injured the domestic steel industry and recommended a complex package of quotas, extra duties and tariff quotas for five years. President Reagan instead opted to negotiate five-year VRAs with 17 countries (in addition to the EC) in hopes of limiting imports to about 20 percent of domestic consumption. As a result, more than four-fifths of U.S. steel imports are covered by bilateral agreements. Many legislators from steel-making states, however, are dissatisfied with the results of the program thus far. Legislative remedies, including a 20 percent tariff and quotas limiting imports to 15 percent of the U.S. market, have been introduced in Congress.

During the past 18 years, the domestic industry has argued for import restraints to give it a "breathing spell" in which to regain international competitiveness. But almost continuous protection from foreign producers has actually worsened the competitive position of the U.S. industry by removing the incentive to make difficult adjustments. Table 4 shows compensation, productivity and investment in the steel industry compared to all manufacturing during the period of import restraints (1968-80) and during the prior decade (1958-68). During the period without import restrictions, the steel industry closely matched other industries in all three categories. But during the period of protection, steel's performance was substantially worse: compensation grew more than twice as fast while productivity advanced only one-fourth as fast, and investment declined. The consequence of protection, therefore, was a less competitive U.S. industry. In addition, the higher steel prices resulting from protection worsened the competitive position of U.S. steel-using industries.

Table 4: Effects of Protection on the U.S. Steel Industry

(annual growth rates)

	Without Protection (1958-68)	With Protection (1968-80)
Real Compensation*		
All Manufacturing	4.10%	8.01%
Steel	4.00	10.37
Productivity		
All Manufacturing	3.18	2.25
Steel	3.30	0.85
Gross Investment**		
All Manufacturing	7.51	3.91
Steel	6.68	-2.85

*Wages for production workers adjusted for inflation using the consumer price index.
**Excluding pollution-abatement equipment.

Source: U.S. Department of Commerce, Office of Business Analysis.

Structural Changes in the U.S. Economy - U.S. steel consumption has followed a downward trend since peaking at 122.5 million tons in 1973. The 98.9 million tons of steel consumed in 1984 were below 1965's level (see Table 5). This decline, despite a 76 percent rise in real GNP during the period, indicates a substantial drop in the importance of steel in the U.S. economy. The ratio of steel consumption per million dollars of GNP declined from 132 tons in 1950 to 108.2 tons in 1965 and 60.3 in 1984. It should be noted, though, there has been a sharp increase in imports of steel-intensive products, such as cars.

Table 5: Steel Consumption in the U.S. Economy

Year	Real GNP (billions of 1972 dollars)	Consumption (thousands of net tons)	Ratio of Steel Consumption to GNP*
1950	$534.8	70,607	132.0
1955	657.5	81,629	124.2
1960	737.2	71,531	97.0
1965	929.3	100,553	108.2
1970	1,085.6	97,100	89.5
1975	1,231.6	89,016	72.3
1980	1,475.0	95,247	64.6
1984	1,639.3	98,922	60.3

*Net tons per million dollars of GNP.

Source: American Iron and Steel Institute, Annual Statistical Report, selected issues.

Such a decline is not unique to this country; once a nation has built its industrial infrastructure, demand for steel levels off. For example, investment in non-residential structures as a share of GNP fell from 4.9 percent in 1966 to 3.7 percent in 1976 before recovering to 4.3 percent in 1984. In addition, as incomes rise, consumers tend both to demand products that have a lower steel content and to consume more services. Services now account for about half of GNP.

In addition to changes in the composition of GNP, a second cause of the decline in steel intensity has been the substitution of lightweight, energy-efficient materials, such as plastics and aluminum. Rising energy costs, for example, prompted auto makers to reduce the amount of steel by about 400 pounds per vehicle between 1978 and 1984.

Rising Importance of Mini Mills - The decline of the U.S. steel industry reflects the weakening of its integrated segment. In these plants, iron ore, coke and limestone are combined in a series of processes to make raw steel and finished products. The industry's mini mill segment, in contrast, has experienced strong growth, capturing markets from both domestic integrated steelmakers and foreign producers. Mini mills are generally smaller plants with electric furnaces that transform scrap metal into finished products such as wire, light structural shapes, and pipes and tubes.

Mini mills' share of U.S. steel output increased from 3 percent in 1960 to 20 percent in 1984. With advances in technology, they are expected to capture 40 percent of the market by the end of the century. These mills employ more advanced technology, including continuous casting, to minimize input costs, and their electric furnaces require only one-third as much energy. Taking advantage of their smaller size, they have located in urban areas close to their product and material markets, thus saving on shipping costs. Moreover, mini mills, which generally employ non-union workers, enjoy substantially lower labor costs and have avoided the adversarial labor-management relations that characterize integrated mills. The leading U.S. mini mill producer, Nucor Corp., has a labor cost of about $55 a ton, compared to $140 a ton for integrated producers.

The Outlook For Japan's Steel Industry

Per-capita steel consumption in most industrialized countries is currently between 500 and 600 kilograms of crude steel, compared to a world average of about 165 kilograms. There is therefore likely to be substantial growth in steel demand in developing regions as incomes rise. Most of the growth in steel production is also likely to take place in less developed countries, aided by government subsidies and other assistance. While output in most industrialized countries has stagnated or even declined during the past 10 years, production in developing countries doubled during the 1974-83 period to 69.7 million tons. Much of the increase took place in Asia, an important market for Japanese producers, accounting for nearly three-fifths of total exports in 1985.

This expansion has reduced the third world's reliance on steel shipments from industrialized nations. In the mid-1970s, imports supplied these areas with more than half of their requirements. But net imports fell from 40.2 million tons in 1981 to 25.2 million tons in 1983, while consumption rose to about 100 million tons. Moreover, the developing countries accounted for 12.4 percent of global steel exports in 1983.

These trends pose an interesting challenge to the future of Japan's steel industry, the world's largest exporter. One issue is whether Japanese producers will be able to maintain their share of the world steel market. A second question is whether imports, which accounted for less than 5 percent of apparent consumption last year, will make significant inroads into Japan's domestic market. With the sharp appreciation of the yen during the past year, imports are certain to increase their market penetration in many industries. The diversification of Japanese producers into non-steel engineering materials, such as ceramics, chemicals and superalloys, as well as other areas, including computers and semiconductors, suggests that they are not entirely confident of their future in steel.

Thus far Japanese producers appear to have successfully avoided the mistakes that made U.S. producers uncompetitive. According to Mitsui & Co., Ltd., Japanese firms invested $19.6 billion in steel from 1979 to 1984, compared to $12.8 billion in the United States. The major mills continue to innovate, producing new products such as sea-water resistant steel for oilwell piping and high-strength steel for nuclear power plants. The number of production workers has been reduced by about 16,000 to 181,592 in 1985 and labor costs have

remained moderate. Wages increases amounted to only 7 percent in inflation-adjusted terms from 1980 to 1985. In contrast to the 4.5 percent average wage hike in this year's spring wage negotiations, steel workers received increases of only 2.7 percent, their smallest ever, and several major firms have frozen executives' wages.

But as in the United States, structural changes in the domestic economy are working against Japan's steel industry. Steel consumption per capita in Japan has fallen from 714 kilograms in 1974 to 548 kilograms in 1983 (see Table 6). In Korea, however, the opposite is true, with per-capita consumption rising from 93 kilograms to 223 kilograms during the same period. Although per-capita consumption in Japan is still 2.5 times greater than in Korea, it is likely that demand will increase rapidly in the future in Korea, while stagnating or even declining in Japan.

Table 6: Per-Capita Steel Consumption

(kilograms of crude steel)

Year	United States	Japan	Korea
1974	680	714	93
1975	547	608	84
1976	604	577	110
1977	618	554	182
1978	672	579	180
1979	640	673	183
1980	508	675	160
1981	565	603	193
1982	363	586	194
1983	404	548	223

Source: International Iron and Steel Institute, Steel Statistical Yearbook, 1984.

Conclusion

The global steel industry in the postwar era has experienced rapid changes in comparative advantage. Steel production in the 1950s was dominated by the advanced nations, particularly the United States, but now this country imports steel from numerous developing countries. Imports have increased their share of the U.S. market from less than 5 percent in 1961 to 25.2 percent last year.

The worldwide shift in comparative advantage threatens Japan's role as the free world's largest and most efficient steel producer. In particular, Korea poses a major challenge. Chase Econometrics estimates that Japanese steelmaking capacity will decline 18 percent to 129 million tons by 1995, while Korea adds 14 million tons of capacity. As Korea's steel industry expands, it will build plants incorporating the latest technology and will enjoy greater economies of scale. It appears inevitable, therefore, that Japan will lose

world market share. Moreover, to maintain their international competitiveness, Japan's automotive makers and other big steel-using industries must have access to the most inexpensive steel. For this reason, it is likely that Japanese steel imports will also increase.

For further information, contact Randall S. Jones.

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The views expressed in this report are those of the author and do not necessarily reflect those of the Japan Economic Institute.